

Claims

1. A fuel cell power plant comprising:
 - a plurality of fuel cells, each of said fuel cells having dimensions in width and height which are substantially equal to the width and height dimensions of the other fuel cells in said stack, where-
5 by the edges of said fuel cells combine to form substantially planar surfaces;
 - a plurality of cooler plates, each having cooler inlet channels and cooler outlet channels and cooler flow channels extending between said inlet channels and said outlet channels, said cooler
10 plates being disposed between at least some of said fuel cells, said cooler plates having principal width and height dimensions substantially the same as those of said fuel cells, each cooler plate having a protrusion containing said coolant inlet channels and a protrusion containing said coolant outlet channels, said protrusions
15 extending outwardly from the edges of said cooler plates, thereby extending away from said plane;
 - an elastomeric rubber sealant material completely surrounding each of said protrusions and extending between each one of said protrusions and a protrusion adjacent to said one protrusion, said
20 elastomeric sealant material extending on either side of all of said protrusions and extending around said plane sufficiently to form a sealing surface; and
 - a manifold structure contacting said sealant material and defining coolant manifolds, said manifold structure defining between
25 itself and said sealant material a (a) an antifreeze coolant inlet manifold in fluid communication with said inlet channels or (b) an antifreeze coolant outlet manifold in fluid communication with said

30 outlet manifold channels, and also defining between itself and said sealant material (c) a reactant gas inlet manifold or (d) a reactant gas outlet manifold.

2. A fuel cell power plant according to claim 1 wherein: said elastomeric sealant material is a silicone rubber.

3. A fuel cell power plant comprising:
a plurality of fuel cells, each of said fuel cells having dimensions in width and height which are substantially equal to the width and height dimensions of the other fuel cells in said stack,
5 whereby the edges of said fuel cells combine to form substantially planar surfaces;

a plurality of cooler plates, each having cooler inlet channels and cooler outlet channels and cooler flow channels extending between said inlet channels and said outlet channels, said cooler
10 plates being disposed between at least some of said fuel cells, said cooler plates having principal width and height dimensions substantially the same as those of said fuel cells, each cooler plate having a protrusion containing said coolant inlet channels and a protrusion containing said coolant outlet channels, said protrusions
15 extending outwardly from the edges of said cooler plates, thereby extending away from said plane;

an elastomeric sealant material completely surrounding each of said protrusions and extending between each one of said protrusions and a protrusion adjacent to said one protrusion, said
20 elastomeric sealant material extending on either side of all of said protrusions sufficiently to form a sealing surface; and

25 a manifold structure contacting said sealant material and defining coolant manifolds, said manifold structure defining between itself and said sealant material a (a) coolant inlet manifold in fluid communication with said inlet channels or (b) a coolant outlet manifold in fluid communication with said outlet channels.

4. A fuel cell power plant according to claim 3 wherein: said elastomeric sealant material is a silicone rubber.

5. A fuel cell power plant according to claim 3 wherein said manifold structure also defines between itself and said sealant material a reactant gas inlet or outlet manifold.

5 6. A fuel cell power plant according to claim 3 wherein: the protrusions of each of said cooler plates containing said coolant inlet channels are disposed on an edge of each cooler plate which is opposite to an edge of each cooler plate from which the protrusion containing said outlet channels extend.

5 7. A manifold structure for a fuel cell power plant adapted to be secured to a sealant surface on a fuel cell stack and forming with said sealant surface either (a) an antifreeze coolant inlet manifold or (b) an antifreeze coolant outlet manifold, and also forming with said sealant surface either (c) a reactant gas inlet manifold or (d) a reactant gas outlet manifold.

8. A manifold structure for a fuel cell power plant adapted to be secured to a sealant surface on a fuel cell stack, said manifold structure having a first chamber defining either (a) an

- 5 antifreeze coolant inlet manifold or (b) an antifreeze coolant outlet manifold, and having a second chamber defining either (c) a reactant gas inlet manifold or (d) a reactant gas outlet manifold.